J. Smit lith. Hanhart imp.

RHINOGALE MELLERI.

3. On the African Mungooses.

By Oldfield Thomas, F.Z.S., British Museum.

[Received December 2, 1881.]

(Plate III.)

In the Zoology of the Yunnan Expedition[1], Dr. John Anderson of the Calcutta Museum has recently fully worked out the Oriental species of that difficult Viverrine group, the Mungooses; and the present paper is an attempt to treat similarly those that are found in Africa. The latter, however, are very much less uniform in structure than the former, as they belong to no less than seven genera, six being peculiar to Africa, while the Oriental forms, as Dr. Anderson has shown, ought all to be included in the restricted genus *Herpestes*.

The Oriental and African Mungooses together form a very natural subfamily, the Herpestinæ[2], quite distinct from the other large group of the Viverridæ, namely the Civets and Paradoxures, or *Viverrinæ*. Prof. Flower, in his well-known paper on the classification of the Carnivora[3], says of the Viverridæ (p. 35) that "they show a great tendency to break into two groups, of which *Viverra*, *Paradoxurus*, *Arctictis*, &c. belong to one, and *Herpestes* and its various modifications to the other, *Rhyzæna* being an aberrant member of the last," and (p. 20) gives a description of the characters of the base of the skull in this group, compared with those of the Viverrinæ. Externally the members of this subfamily are distinguished by their comparatively lithe and slender form, and by their generally blunt, elongated, and but slightly curved claws, as compared with the short, sharp, semiretractile, and strongly curved claws of most of the Viverrinæ.

The following are the only two previous papers of any importance on the subject of the African species of this group:—(1) Temminck, Esq. Zool. Côte Guinée, pp. 93–118 (1853); and (2) Gray, P.Z.S. 1864, pp. 547–579.

The first of these contains much useful information, especially with regard to the variation to which these animals are subject; nevertheless, notwithstanding his clear insight into the badness of other people's species, Temminck formed several bad species of his own in it. The second, by Dr. Gray, is a complete revision of the group, in which, however, such a large number of untenable genera are formed, and so many bad species are made and allowed, that the confusion into which the group had fallen cannot be said to have been removed by it. On the other hand, it must be admitted that

[1] *Op. cit.* p. 168 (1878).

[2] On the principle of strict priority this name ought to be *Suricatinæ*, *Suricata* antedating *Herpestes* by seven years; but it would be so obviously unsuitable to call the subfamily after one of its most aberrant members, that I think we are justified in using the later and more classical term.

[3] P.Z.S. 1869, p. 4.

his general arrangement of the group seems to be a very natural one, and has, in its main outlines, been followed here.

With regard to the genera treated of, I have only taken those found actually on the continent of Africa, and have therefore not included the aberrant forms *Galidia*, *Galidictis*, and *Eupleres*[1], which are only found in Madagascar, and of which the species present but little difficulty, so that there is no need for any special revision of them[2]. On the other hand, none of the true Mungooses are indigenous to Madagascar, though one or two of them have been recorded from there; but these would seem either to have been introduced, or the correctness of their locality to have been very doubtful. It must be remembered that the artificial introduction of animals of this group is by no means unlikely, as Mungooses are constantly tamed by the natives, and would thus easily be carried by them from one place to another [3].

In preparing this paper I have had the advantage of examining the collections, each possessing many typical specimens, contained in the Berlin, Leyden, and Frankfort Museums, in addition to the large series in our own national collection. I have thus seen nearly 250 African Mungooses, including the types of the species described by Gray, Peters, Rüppell, Temminck, Smith, and others, the names of these species being marked with asterisks in the synonymy below. All together, of the *seventy-five* good and bad species described, I have examined the types of thirty-one, the greater part of the remainder being species named either from rough travellers' descriptions, from previously published figures, or else merely in alteration of earlier names.

I must here thank Prof. Peters of Berlin, and Prof. Schlegel and Dr. Jentink of Leyden for the facilities they have afforded me of seeing the specimens under their charge, and Prof. Milne-Edwards for much useful information with respect to the typical specimens contained in the Paris Museum.

Before commencing the detailed review of the species, I think it will be useful to make a few remarks concerning the characters which should be especially attended to by any one wishing to name an African specimen of this group.

In the first place, I would call attention to the variation to be observed in the coloration of certain species: thus in *Herpestes gracilis*, the three varieties are extraordinarily different in their general colour, while the plan of coloration and all other characters are precisely identical; these different colours moreover are not strictly confined

[1] These genera all differ from the continental Mungooses in not possessing an alisphenoid canal, a character present in all those treated of here.

[2] Dr. Jentink has recently worked out the species of the genus *Galidia* (Notes Leyd. Mus. i. p. 131, 1879).

[3] The only true Mungoose collected without doubt in Madagascar, that I know of, is a young individual of *Crossarchus fasciatus*, obtained by Van Dam, and now in the Leyden Museum. Prof. Milne-Edwards informs me that, in his opinion, "Le Vansire" (*Herpestes galera*), usually said to have originally come from Madagascar, was certainly not obtained there, no other collectors having met with it in that island since.

to any locality, though there is a certain tendency for all, or at least most of the specimens from one district to be alike in colour; in fact, if this had not been so, I should not have felt justified in regarding the various forms even as distinct varieties. Again, *H. albicauda* varies most peculiarly in the amount of white present on the tail, some specimens having that member nearly entirely white and others wholly black, individuals of each type being moreover found in the heart of the district mostly inhabited by those of the other. Another remarkable point in connection with variation in colour is the fact that in certain species there seem to be two forms, one with annulated and the other with unannulated fur. Thus ordinary specimens of *H. galera*, Gr., have annulated fur, while others from various localities, among which are the types of *H. pluto*, Temm., have their longer hairs entirely unannulated. In the same way *H. mutgigella*, Rüpp., seems to be the unannulated form of *H. gracilis*, *H. iodoprymnus*, Heugl., being intermediate, and *H. granti*, Gr., similarly that of *H. badius*. It is of course possible that these two forms represent a seasonal change, though the few dated specimens that I have seen do not, on the whole, lend much support to this view, especially when we remember how comparatively little seasonal change of temperature must occur in the region with which we now have to deal.

In the second place, attention should be drawn to the apparent frequency with which specimens of this group seem to lose the minute first toes on both fore and hind feet. Thus both "*Cynictis*" *melanura* and "*Galerella*" *ochracea* [1] owe their generic names to the fact of their halluces having been accidentally lost; and *Bdeogale nigripes*, Puch., has probably been referred to that genus for the same reason [2]. In the work already referred to [3], Temminck has drawn attention to this same point, and has given several instances which had fallen under his own observation. The minute claw of the first toe is probably very easily knocked off during the skinning and stuffing of specimens; and the digit itself, without the claw, is so small and inconspicuous that it would not be observable without the closest scrutiny. On the whole it would seem that though some few cases may occur in which the claw has either never been developed or has been knocked off during life, yet as a rule, so far as I have seen, the loss has probably occurred after death, there being generally distinct traces of the former presence of the claw, thus showing that it could not have been lost during life, for then the skin would presumably have healed over the place.

Thirdly, it is worthy of note that while the *dimensions* of the teeth are very constant, their number is by no means so: thus, one of our specimens of *Crossarchus zebra* (p. 89) has an additional true molar above on each side behind the two normal ones, the extra ones not being in any way crowded or rudimentary, but fully

[1] I have softened and opened the skin of the hind foot of the type of this species, and found, as I expected, a broken metatarsus, about one tenth of an inch in length, and of the usual thickness, adhering to the entocuneiform bone.

[2] See below, p. 77.

[3] *Op. cit.* p. 107.

developed, and looking quite as if that species always possessed them. Again, a specimen of *H. gracilis* has an additional lower premolar standing side by side with the third normal one; but this differs from the last instance in being more obviously an abnormality. The type of *Rhinogale melleri*, as mentioned below (p. 81), has one more upper premolar on each side than is found in any other species of the group; but as, so far as I know, this typical specimen is unique, I cannot say whether the dental formula possessed by it is constant or not. On the other hand, a deficiency in the full number of teeth is very common, all the species with normally four upper premolars often losing the first one, which when present is always much smaller than any of the others.

It has just been mentioned that the dimensions of the teeth are very constant; and so much is this the case that I have found that the comparative measurements of the fourth upper premolar and second molar afford very good specific characters; for in those species in which the teeth are more or less round and suitable for grinding rather than cutting, the second molar is of considerable size and the fourth premolar is but little larger, while, on the other hand, when the teeth are slender, angular, and with cutting-edges, as in *H. ichneumon*, the last molar is very small and rudimentary and the last premolar is large and has a well-developed anterior internal process. As an instance of these differences, I may mention the cases of *H. albicauda* and *H. ichneumon*, in the first of which the last molar is from 71 to 84 per cent. of the fourth premolar, while in the latter these percentages range only from 42 to 45.

The measurements upon which these percentages are founded are those of the greatest diameter of the tooth—in the fourth premolar from the posterior point of the tooth to the anterior edge of the internal lobe, and in the last molar simply the greatest transverse diameter of the tooth. The percentages obtained by these measurements are called in the synopses of the species the "dental percentages;" and a table is given at the end of each genus showing the exact dimensions, with the resulting percentages, of the teeth of its members.

Synopsis of the Genera.

A. With a naked groove from the muzzle to the upper lip.

I. Toes 5—5.

a. Premolars $\frac{4}{4}$ (if only 3 in either jaw, a diastema always present) ..... I. HERPESTES.

b. Premolars $\frac{3}{3}$ (no diastema in front of 1st premolar). Hind soles naked ..... II. HELOGALE.

II. Toes 4—4.

c. Premolars $\frac{4}{4}$. Hind soles hairy ..... III. BDEOGALE.

III. Toes 5—4.

d. Premolars $\frac{4}{4}$. Hind soles hairy ..... IV. CYNICTIS.

B. No groove from nose to upper lip.

IV. Toes 5—5.

e. Premolars $\frac{3}{4}$[1]. Palate concave. Hind soles hairy V. Rhinogale.

f. Premolars $\frac{3}{3}$[2]. Palate flat. Hind soles bald..... VI. Crossarchus.

V. Toes 4 -4.

g. Premolars $\frac{3}{4}$. Hind soles bald..... VII. Suricata.

I. Herpestes.	Type.
"*Mangusta*, Oliv."[3], Illig., Desm., Fisch., &c. ..	?
Ichneumon, Lacép. Mém. de l'Inst. iii. p. 492 (1801) (nec Linn. S. N. i. p. 930, 1766)	*H. ichneumon.*
Herpestes, Illig. Prodr. Syst. Mamm. p. 135 (1811).....	*H. ichneumon.*
Atilax, F. Cuv. Hist. Nat. Mamm. iii. livr. 54 (1826)	*H. galera.*
Mungos, Ogilby, P. Z. S. 1835, p. 103 (1835)..	*H. vitticollis.*
Urva, Hodgs. Journ. As. Soc. Beng. vi. p. 560 (1837)	*H. urva.*
Mesobema, Hodgs. Journ. As. Soc. Beng. x. p. 910 (1841)	*H. urva.*
Osmetectis, Gray, Ann. & Mag. N. H. x. p. 260 (1842)	*H. urva.*
Calogale, Gray, P. Z. S. 1864, p. 560 (1864) ..	*H. nepalensis.*
Galerella, Gray, t. cit. p. 564 (1864)	*H. gracilis.*
Calictis, Gray, t. cit. p. 565 (1864).....	*H. smithii.*
Tæniogale, Gray, t. cit. p. 569 (1864)	*H. vitticollis.*
Onychogale, Gray, t. cit. p. 570 (1864)..	*H. maccarthiæ.*

Toes 5—5. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{4}{1}$, M. $\frac{2}{2}$, $\times 2 = 40$. Underside of tarsus generally naked. Fur of two kinds, the longer usually annulated, so as to give the animal a grizzled appearance. Tail long, varying from about half to nearly equal the length of the head and body together. First toes on both fore and hind feet very small, probably nearly functionless. Claws of medium strength.

Range. S. Europe, all Africa, Asia Minor, Persia, and nearly the whole of the Oriental zoological region.

To this, the typical genus, belong all the Indian and nearly half of the African species. There is a great variation in size and colour among its various members; but the cranial characters are very fairly

[1] In the only known specimen, very possibly not constant.

[2] In all the specimens seen; but a diastema is generally present, so that there is probably a minute first premolar in immature individuals.

[3] This name is frequently quoted by the early authors as having been given by Olivier; but I cannot find that it was ever used by him. In fact, in his 'Voyage dans l'Empire Ottoman, l'Egypte et la Perse,' vol. iii. p. 100 (1804), he uses the Linnean term *Viverra ichneumon*. Even if, however, the name *Mangusta* was ever characterized before 1811, I think we should be justified in ignoring it, as it is altogether barbarous, and Illiger's name has received universal acceptance. Agassiz (Nomencl. Zool. i. p. 19) cites *Mangusta* as having been described by Baron Cuvier in his 'Tableau Elémentaire,' 1797; but there is no mention of the genus in that work.

uniform. Dr. Anderson, in the work quoted above, has fully described and figured the skulls and dentition of the Indian forms; and the African ones are very similar, if we except *H.* (*Ichneumia*) *albicauda*, which has, of course, as forming a distinct subgenus, many characters peculiar to itself.

Synopsis of the Species.

A. Tarsus nearly or quite naked below. Upper M^2 40–60 per cent. of $P.M^1$. Last lower molar small, with only 2 external cusps. (Subgenus Herpestes.)
  I. Tip of tail with a dark-coloured pencil.
    a. Tail-tip black.
      a. Size large: head and body 20 in. or more.
        a'. Skull half as broad as long. Palæarctic 1. *H. ichneumon*, p. 64.
        b'. Skull less than half as broad as long. Ethiopian ..... 2. *H. caffer*, p. 66.
      β. Size small: head and body 12–14 in. ... 3 *H. gracilis*, p. 68.
    b. Tail-tip red.
      γ. Size small: head and body about 12 in. ... 4. *H. sanguineus*, p. 71.
  II. Tip of tail not darker.
    c. Dark rufous. Size large: head and body 20–26 in. ..... 5. *H. galera*, p. 72.
    d. Dark grizzled grey. Size medium: head and body 14–15 in. ..... 6. *H. pulverulentus*, p. 74.
    e. Light grizzled grey. Size small: head and body 10–13 in. ..... 7. *H. punctatissimus*, p. 74.

B. Tarsus hairy beneath. Upper M^2 more than 70 per cent. of $P.M^1$. Last lower molar large, with 3 external cusps. (Subgenus Ichneumia).
  I. Tail very bushy. Size large, 22–26 in. ..... 8. *H. albicauda*, p. 75.

1. Herpestes ichneumon.

Viverra ichneumon, Linn. Syst. Nat. i. p. 63 (1766).
Ichneumon pharaon, Lacép. Mém. de l'Inst. iii. p. 492 (1801).
Ichneumon ægypti, Tiedem. Zool. i. p. 364 (1808).
Herpestes pharaonis, Geoff. Descr. de l'Egypte, H. N. ii. p. 139 (1812).
H. numidicus, F. Cuv. Hist. Nat. Mamm. iv. livr. 68 (1834).
* *H. widdringtoni*, Gray, Ann. & Mag. N. H. ix. p. 50 (1842).
H. dorsalis, Gray, P. Z. S. 1864, p. 549 (ex Smith, S. Afr. Quart. Journ. ii. p. 113, 1835) (1864).

Hab. Southern Spain, Asia Minor, Palestine, and Africa north of the Sahara.

Size large, about 20 inches; form slender; tail about 4 to 5 inches shorter than the head and body. Fur long, especially on the rump and basal quarter of the tail, where the longer hairs are often 4 or more inches in length. General colour dark grizzled grey-brown, the hairs annulated with dark red-brown and creamy yellow, the tips of the back hairs darker yellow. Underfur thick and woolly, bright rufous in colour. Tip of tail shining black, the hairs elongated so as to form a distinct tassel, sometimes reaching 5 inches beyond the vertebræ. Feet dark brown. Underside of hind feet generally quite naked, the part under the calcaneum sometimes, though rarely, hairy.

Skull comparatively short and broad, the breadth nearly always more than half the length (49–56 per cent.). Teeth slender and sharp, the last molar less than half the length of the 4th premolar (42–48 per cent.).

Dimensions.

	Head and body[1].	Tail.	Hind foot[2].
a. Spain (type of *H. widdringtoni*)..	20·0	17·0	3·7
b. Egypt	21·0	16·0	3·8
c. Palestine (*Tristram*).....	21·0	15·0	3·4
d. Andalusia (*Lord Lilford*)	21·0	16·0	3·4
e. Morocco (*Parzudaki*)	20·5	15·0	3·4

Skulls.

	Length[3].	Breadth[4].	Palate-length.[5]	Palate-breadth[6].	Inc. to cross line[7].	Basi-cranial axis[8].
a. Spain (Zool. Soc.)	4·05	2·25	2·28	1·30	1·34	
b. Egypt	3·85	2·04	2·20	1·24	1·40	1·41
c. N. Africa	3·7	2·0	1·93	1·17	1·30	1·4

For dimensions of teeth, see p. 78.

[1] From the tip of the nose to the root of the tail, along the curves. Unless otherwise stated, the measurements are taken from stuffed specimens.

[2] Without the claws.

[3] From the front of the præmaxillæ to the most posteriorpoint of either of the occipital condyles.

[4] Greatest breadth across zygomata.

[5] From the front of the præmaxillæ to the end of the bony palate.

[6] Between the points at which P.M[4] and M[1] touch each other at their outer edges.

[7] From the front of the præmaxillæ to a point on the palate midway between those mentioned under 6.

[8] From the central point of the posterior edge of the basioccipital to the anterior edge of the lower surface of the præsphenoid.

It will be seen that, of these skull-measurements, Nos. 3, 4, and 5 are the same as those adopted by Prof. Huxley in his recent paper on the Canidæ (P. Z. S. 1880, p. 243). I do not, however, think that the measurement of "total length" used by him is at all satisfactory, as the occipital spine, to the tip of which he measures, varies greatly with the age of the individual, and also between different species—some forms developing a bony crest comparatively early, and others, even when quite old, having scarcely any at all. These objections do not apply to measuring from the posterior point of the condyles, which is a place where no extra bony matter is added as the animal gets older. It is true that it would seem to be somewhat unnatural to measure from a central azygous point to a lateral symmetrical one; but practically the resulting dimension is so nearly exactly the same as measuring either to the upper part of the supraoccipital, *not* including the spine, or to the centre of the same bone just above the *foramen magnum*, that this objection is overbalanced by the convenience of measuring to the most posterior non-varying point of the skull, and a point which can always be used with such extreme exactitude.

The measurement given under 7 is a very useful one, as giving the true length

2. Herpestes caffer.

Viverra cafra, Gmel. Linn. S. N. i. p. 85 (1789).

H. griseus, Smuts, Enum. Mamm. Cap. p. 19 (nec Desm.) (1832).

H. madagascariensis, Smith, S.Afr. Quart. Journ. ii. p. 114 (1835).

? *Herpestes bennettii*, Gray, Loudon's Mag. N. H. i. p. 578 (1837).

Hab. Africa south of the Sahara.

Somewhat larger than *H. ichneumon*, about 23 inches. Colours as in that species, with the following exceptions:—The annulations on the longer hairs are somewhat narrower, and consist of deep shining black and pure white rings, instead of brown or yellow ones, thus causing the general colour to be a much clearer grey; and the underfur is dark and dull (not bright) rufous, and sometimes simply dark grey-brown. Underside of hind feet always naked. Skull, compared with that of *H. ichneumon*, longer and narrower, the breadth always less than half the length (46 to 48 per cent.). Teeth and other characters as in *H. ichneumon*.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Kingwilliamstown (*Trevelyan*) ..	22·0	18·0	3·7
b. S. Africa	23·0	19·0	3·9
c. ,, ...	23·0	19·0	4·0
d. ,, ...	23·0	19·0	4·0

---

of the muzzle, a dimension not satisfactorily shown by merely taking the "palate-length," because the amount to which the bony palate extends behind the molars varies considerably, both between different individuals and different species.

With regard to the "basicranial axis," I have been compelled, with some hesitation, to use a different measurement from that given by Prof. Huxley, because, first, his anterior point, easy enough to take in a bisected skull, cannot be found with any exactitude in a whole one; and, secondly, in many genera of Carnivora, for instance in the group at present under discussion, this spot as defined by him for a non-bisected skull ("a point opposite the middle of the distance between the optic and ethmoidal foramina") falls considerably inside the posterior nares, and does not by any means "lie a little behind the posterior extremity of the vomer," as it does in the Dogs. The axis I propose, however, is easily measured in all states of the skull; and a similar and corresponding axis may be readily obtained, not only in all the different genera of Carnivora, but also throughout almost the whole of the Mammalian class. I have, for example, long used this same axis in my notes on Rodents' skulls, where it is always very readily observable.

This axis, moreover, equally shows, in a horizontal line, what Prof. Huxley's axis shows in an oblique one, namely the combined lengths of the basioccipital, basisphenoid, and præsphenoid bones, which, according to that author, "represent the foundation around and upon which the other parts are built."

The measurements throughout are in English inches and tenths, except in the case of the tables of dimensions of teeth, where, a very small unit being required, they are given in millimetres.

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Incisors to cross line.	Basicranial axis.
a. Cape	c. 4·3	2·14	2·47	1·35	1·50	1·55
b. No locality ..	4·18	1·98	2·35	1·24	1·49	1·50
c. Kingwilliamstown	4·15	1·91	2·36	1·28	1·50	—

For teeth, see p. 78.

These two closely allied species, *H. ichneumon* and *H. caffer*, seem to be very common over their respective ranges. There can never be any difficulty in distinguishing either of them from all others, as their large size and long black tail-tips readily separate them from all their congeners. Their nearest ally seems to be *H. jerdoni*, Gr., from India; but that is considerably smaller, and has an entirely distinct range from either of them.

With regard to their distinctness from each other, I was at first disposed to regard them as only races of one species, as Temminck had done; but I have found such constancy in their distinguishing characters that, combined with the fact of their ranges being in different zoological *regions*, I have been induced to retain them as distinct species. There is no doubt, however, that they are very closely allied; but when we remember how very distinct the faunas of the southern Palæarctic and of the Ethiopian regions are, scarcely any species being common, it would naturally seem preferable to consider as distinct two forms so fairly well marked as are *H. ichneumon* and *H. caffer*, when the line of demarcation between them so exactly corresponds with what is generally recognized as the boundary between the two zoological regions.

I cannot find any characters whatever by which to separate, even as a variety, the Spanish Ichneumon (*H. widdringtoni*) from the form found on the southern side of the Straits of Gibraltar.

In the specific diagnosis of *H. ichneumon* given above, mention is made of the fact that occasionally the posterior part of the hind soles are hairy, instead of being bald as is usual. In connection with this, it is worthy of remark that a partly hairy sole seems to be accompanied by an increased length of the hallux, as though certain individuals or families were accustomed, probably on account of the nature of the soil, to walk in a more digitigrade manner than usual, and the hallux were in these cases elongated sufficiently to reach the ground. In *H. galera* I have also found the same thing, there being one of our West-African specimens of that species with a hairy sole and elongated hallux, whilst all others of the large series that I have examined have naked soles and short halluces.

The following will show the extent of these differences, which, being quite unaccompanied by other special characters, are most certainly not specific:—

In a hairy-soled *H. ichneumon* the posterior 0·9 in., and in the similar *H. galera* 1·45 in., is densely clothed with hair, while in all

other specimens of both species there is no hair at all on the soles from toes to heel. And as to the length of the hallux, in the hairy-soled forms of the two species its claw reaches to within 0·23 and 0·27 in. from the most anterior point of the large central foot-pad, while in other specimens these measurements average 0·52 and 0·64 in. respectively.

With regard to the habits of these large Mungooses, the manner in which *H. ichneumon* destroys the eggs of the crocodile is well known; and there is no doubt that it is of considerable use to the country in this way. Smuts[1] says of *H. caffer*:—This animal lives in many parts of the Cape colony, mostly in holes in the earth. It feeds principally upon mice, the smaller birds, and amphibians, and is often kept in a state of domestication on account of the services it renders in destroying these animals."

3. Herpestes gracilis.

a. Typical variety.

**H. gracilis*, Rüpp. N. Wirb. Abyss. p. 29, pl. viii. fig. 2 (1835).

**H. mutgigella*, Rüpp. t. cit. p. 29, pl. ix. fig. 1 (1835).

Ichneumia nigricaudatus, Geoff. Mag. Zool. 1839, p. 18 (1839).

H. galinieri, Guérin, Ferret & Galinier, Voy. Abyss., Atl. Zool. pl. i. fig. 1 (juv.) (1847–48).

**H. punctulatus*, Gray, P. Z. S. 1849, p. 11 (1849).

H. lefebvrei, Des Murs & Prév., Lefebvre Voy. Abyss., Atl. Zool. pl. i. (in text *H. gracilis*) (1850).

**H. ornatus*, Peters, Reise nach Mossambique, Mamm. p. 117, pl. xxvi. (1852).

H. ochromelas, Puch. Rev. et Mag. Zool. vii. p. 393 (1855).

**H. iodoprymnus*, Heugl. Nov. Act. Ac. Leop. xxix. p. 23 (1861).

H. adailensis, Heugl. Peterm. Geogr. Mittheil. 1861, p. 17 (1861).

H. mutscheltschela, Heugl. Reise N.O. Afr. ii. p. 41 (ex Rüpp.) (1877).

H. ruficauda, Heugl. Reise N.O. Afr. ii. p. 43 (1877).

Hab. East-African subregion—from Cape Verd round by Abyssinia to Natal.

b. Variety *melanurus*.

**Cynictis melanura*, Martin, P. Z. S. 1836, p. 56 (1836).

Hab. West-African subregion—Sierra Leone to Cameroons.

c. Variety *badius*[2].

**Ichneumon ratlamuchi* et *cawi*, A. Smith, App. Rep. S. Afr. Exp. p. 42 (1836).

[1] Enum. Mamm. Cap. p. 20, 1832.

[2] I have used this name in preference to either of Dr. Smith's previous names for this variety, because not only is it more classical and extremely appropriate, but Dr. Smith himself proposed the alteration, and therefore there can be no injustice in ignoring his earlier names.

**Herpestes badius*, Smith, Ill. Afr. Zool. pt. ii. pl. iv. (1838).
**H. granti*, Gray, P. Z. S. 1864, p. 561 (1864).
**Calogale venatica*, Gray, t. cit. p. 563 (1864).

Hab. South-African subregion, and northwards to Zanzibar.

d. Variety *ochraceus*.

**H. ochraceus*, Gray, P. Z. S. 1848, p. 138, pl. viii. (1848).
Galerella ochracea, Gray, P. Z. S. 1864, p. 564 (1864).

Hab. Abyssinia.

Specific Characters.—Size small, form slender; tail slightly shorter than the head and body. Fur of medium length, not longer either at the base or tip of the tail; colour very variable, sandy, rufous, or dark grey-brown. Tip of tail always deep shining black, the black part varying from 1 to 4 inches in length. Underside of tarsus naked. Skull like that of a miniature *H. ichneumon*; the teeth similarly slender and sharp. Last molar about half the length of the 4th premolar (46 to 59 per cent.).

Varietal Characters.

Typical variety.—General colour above and below dark brownish grey, with or without black annulations; the tips of the hairs often with a distinct ruddy tinge. In unannulated specimens the black tail-tip not so sharply separated from the rest of the tail.

Var. *melanurus*.—General colour above and below dark rufous, distinctly annulated with black. Fur short and crisp.

Var. *badius*.—Bright rufous, sometimes annulated with black. Fur rather long and soft.

Var. *ochraceus*.—Light sandy yellow, annulated, in the only known specimen, with black.

Dimensions.

Typical variety.	Head and body.	Tail.	Hind foot.
a. Abyssinia (*Rüppell*)	14·5	12·0	2·5
b. Natal (Type of *punctulatus*)	12·5	11·5	2·3
Var. *melanurus*.			
c. Sierra Leone	13·0	11·0	2·3
Var. *badius*.			
d. S. Africa (type)	12·8	11·0	2·0
e. Cape	12·0	10·7	1·9
Var. *ochraceus*.			
f. Abyssinia (type), imm.	10·0	9·8	1·9

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
Var. *gracilis.*						
a. Abyssinia (*Blanford*)	2·54	1·34	1·32	0·81	0·89	1·0
b. Natal (type of *H. punctulatus*)	2·55	1·30	1·31	0·81	0·90	—
Var. *melanurus.*						
c. Sierra Leone (*Lord Derby*)	2·5	1·32	1·40	0·80	0·90	—
Var. *badius.*						
d. Mgunda Mkali (type of *H. granti*)	2·45	1·22	1·25	0·82	0·85	—
e. S. Africa	2·5	1·27	1·29	0·80	0·85	0·96
Var. *ochraceus.*						
f. Abyssinia (*Hora*), imm.	c. 2·19	1·20	1·10	?	0·78	—

This variable species appears to be the common small Mungoose of the whole of Africa. The distribution of its three principal varieties is somewhat interesting as so closely corresponding to the zoological subregions of Africa, as defined by Mr. Wallace in his 'Geographical Distribution of Animals'[1]. Thus, the true *H. gracilis* is found from Cape Verd and Senegal across to Abyssinia and southwards to Natal, a range nearly exactly agreeing with the "East-African" subregion. I have seen no specimens of this species from Angola or Damaraland, so that I cannot say what, if any, form is found there; but, according to Mr. Wallace, we should also expect to find the true *H. gracilis* in that district. Again, the varieties *melanurus* and *badius* occur, the first all over the "West-," and the latter over the "South-African" subregions. It is true that specimens belonging to the true *H. gracilis* are sometimes, though rarely, found in both the other subregions, and *H. badius* occurs as far north as Zanzibar in the East-African subregion; but these facts only show the necessity for regarding the various forms as varieties, and not as species, which they might fairly be considered to be if each was strictly confined to its own district.

It will be seen by the above synonymy that the variability in colour of *H. gracilis* has caused the formation of a considerable number of untenable species. The asterisks prefixed to the names show that I have seen typical specimens of the greater part of these so-called species; and I do not think there can be much doubt in the case of any of them. In my opinion, *H. mutgigella*, which at first sight seems so different from the rest, represents simply the unannulated form of *H. gracilis*, an intermediate state being represented by a typical specimen of *H. iodoprymnus*, Heugl., in the Leyden Museum. Of the other names, I am not quite certain whether *H. adaileusis*, Heugl., should not rather be placed under

[1] Vol. i. p. 258, and map, p. 250 (1876).

var. *ochraceus*; but without seeing a specimen I cannot be certain on this point.

In Temminck's paper mentioned above, very nearly the same conclusions are come to with regard to these small *Herpestæ* with black tail-tips. I am, however, disposed to demur to his statement that all the differences between what are here considered *varieties* are merely owing to seasonal change; for it would be obviously improbable that all the Abyssinian specimens known should have been taken in the winter, and nine tenths of the West- and South-African specimens in the summer. No doubt, however, a certain amount of change does take place according to season; but we cannot determine the amount of this until there are considerable series of *dated* specimens available for examination.

4. Herpestes sanguineus.

**H. sanguineus*, Rüpp. N. Wirb. Abyss. p. 27, pl. viii. fig. 1 (1835).

Hab. S. Egypt (Kordofan).

(Types, Frankfort Museum.) Form and size much as in *H. gracilis*. Fur short and rather harsh. General colour very pale fawn. Hairs annulated with brown and yellowish white, the latter predominating, and so arranged that there is an appearance of cross stripes on the posterior half of the back. Tail with longer hairs, which are annulated with black and white, though the black is not at all conspicuous. Tail-tip yellowish red, sharply separated from the rest. Feet nearly white.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Kordofan (*Rüppell*)	12·2	11·9	2·1
b. ,, ,, ...	12·0	12·2	—
c. ,, ,, ...	11·9	10·8	1·9

Skull.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.
a. ..	2·35	1·15	1·18	0·73	0·82

This species, hitherto only found in Kordofan, is evidently a desert form, having the sandy coloration usually found in animals inhabiting sandy plains. Dr. Rüppell seems to have found it numerous, as he brought home five or six specimens. He states that it lives in holes in the ground, among bushes, and that, though fierce when wild, it is yet easily tamable. Herr von Heuglin also found it, though not commonly, in the same region.

Dr. Rüppell states that there are in *H. sanguineus* only 22 caudal vertebræ, while there are 25 in *H. gracilis* and 28 in *H. ichneumon*. Not having any material on which to found similar observations, I cannot say whether these numbers are constant or not; but a consi-

derable series of perfect skeletons would be necessary before one could place any reliance upon them as a specific character.

5. HERPESTES GALERA.

a. Typical variety.

Mustela galera, Erxl. Syst. Reg. Anim. i. p. 453 (1777).
Viverra nems, Kerr, Linn. S. N. p. 160 (1792).
Mustela afra, Kerr, t. cit. p. 175 (1792).
Ichneumon galera et *major*, Geoff. Descr. Egypte, Hist. Nat. ii. p. 138 (1812).
Atilax vansire, F. Cuv. Hist. Nat. Mamm. iii. livr. 54 (1826).
Herpestes paludinosus, G. Cuv. Règne Anim. ed. 2, i. p. 158 (1829).
**Mangusta urinatrix*, A. Smith, Zool. Journ. iv. p. 437 (1829).
**Herpestes pluto*, Temm. Esq. Zool. Guin. p. 95 (1853).
**Herpestes loempo*, Gray, P. Z. S. 1864, p. 551 (nec Temm.) (1864).
Athylax vansire et *paludosus*, Gray, P. Z. S. 1864, p. 557 (1864).
Hab. West and South Africa.

b. Variety *robustus*.

**Athylax robustus*, Gray, P. Z. S. 1864, p. 558 (1864).
Hab. East Africa (White Nile).

Specific Characters.—Size very large, form stout and heavy. Tail shorter than the body without the head. General colour either grizzled reddish brown and white, or dark blackish brown without annulations[1]. Underfur greyish brown. Feet dark brown. Tail coloured like the body, but rather darker, sometimes gradually becoming nearly black towards the end, the black never sharply separated as in *H. ichneumon*. Belly similar to back. Cheeks generally with a peculiar indistinct whitish mark from the angle of the mouth to below the ear. Hind soles as a rule quite naked, sometimes with the posterior third hairy[2].

Skull very stout and heavy, the lower jaw particularly so, with a distinct and well-marked chin in adults. Teeth rather small in proportion. Last molar more than half the last premolar (56–61 per cent.).

Varietal Characters.

Var. *galera*. Smaller: skull less than 4·3 inches in length.
Var. *robustus*. Larger: skull more than 4·5 inches in length.

Dimensions.

Typical variety.	Head and body.	Tail.	Hind foot.
a. Cape	24·5	13·0	3·9
b. „	24·0	13·5	3·9
c. W. Africa	24·0	....	3·8
Var. *robustus*.			
d. Type: E. Africa....	26·5	12·5	4·0

[1] See above, p. 61.
[2] See above, p. 67.

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. S. Africa	3·75	2·11	2·15	1·37	1·32	1·20
b. ,, ...	3·85	2·13	2·16	1·35	1·37	1·31
c. ,, ...	4·25	....	2·45	1·42	1·55	1·53
d. W. Africa....	4·25	2·52	2·38	1·38	1·50	1·46
Var. *robustus*.						
e. White Nile (type).....	4·55	2·45	2·60	1·43	1·66	—
f. No loc. (Berl. Mus.).....	4·52	2·56	2·65	1·54	1·55	—

This large species was first mentioned as long ago as 1661 by Flacourt, in his work on Madagascar[1]. It is there called "Vondsira," which name forms the basis of Buffon's term "Le Vansire." Its reputed occurrence in Madagascar caused Dr. Gray and others to believe that there were two species, the one in Africa being naturally supposed to be distinct; but now, as no other specimens have since occurred in Madagascar, we are justified in concluding that Flacourt only saw an introduced specimen, and that it is not indigenous to that island.

I have preserved Dr. Gray's *H. robustus* as a distinct variety, because the skulls show that there is a considerable difference in size between this eastern form and that found in the west and south. It unfortunately happens that the specimen of *H. robustus* in the Berlin Museum, the dimensions of the skull of which are given above, has no locality recorded for it, so that I do not know any thing about the extent of the range of this variety; the British-Museum specimen was obtained from the White Nile.

On this species the genus "*Athylax*" has been formed; but there does not seem to be sufficient reason for its separation from the typical *Herpestes*.

It is just worthy of note that large specimens of *Crossarchus obscurus* are often so extremely similar in colour and proportions to small ones of this species, that an examination of the muzzle or skull is needed to show to which group they belong.

The variation in the hairiness or otherwise of the hind soles of this species has already been referred to[2]. As, judging from Smuts's account of its habits, Cuvier's name *H. paludinosus*, the "Marsh" Ichneumon, is correct for the ordinary naked-soled individuals, it seems probable that those with the hinder portion of the soles hairy live on a dry soil, where, one would imagine, they would not have to walk in so wholly a plantigrade manner as if they lived where the ground was soft and muddy and where a digitigrade animal would be liable to sink in at every step.

Smuts says of *H. galera*[3]:—"This animal lives in marshy places,

[1] 'Histoire de la grande isle Madagascar,' p. 154 (1661).
[2] Above p. 67. [3] *T. cit.* p. 22.

and on the banks of the smaller rivers of the extreme south of Africa; its principal food consists of frogs, crustaceans, &c."

6. Herpestes pulverulentus.

H. pulverulentus, Wagn. Münch. Gel. Anzeig. ix. p. 426 (1839).
**H. apiculatus*, Gray, P. Z. S. 1864, p. 551 (1864).

Hab. Eastern half of the Cape colony.

Size rather small, form somewhat stout. Tail about as long as the body without the head. Soles of hind feet hairy below calcanea; the rest naked, at least in the centre. Fur rather long, soft, and shining. General colour uniform grizzled grey, the longer hairs annulated with equal-sized rings of black and white or yellow. Underfur brown for its proximal, and grey for its distal half. Tail-hairs long, coloured like the body to the extreme tip. Feet slightly darker than the body.

Skull very like that of *H. gracilis*, though somewhat stouter and the teeth heavier. Last molar less than half the length of the last premolar (43–44 per cent.).

Dimensions.

			Head and body.	Tail.	Hind foot.
a.	S. Africa	Co-types of *H. apiculatus*, Gr.	14·0	11·5	2·4
b.	„		14·0	11·3	2·6
c.	„	.....	15·0	11·4	2·3
d.	„	.....	13·0	10·0	2·4

Skulls.

		Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a.	Kingwilliamstown (*Trevelyan*) ..	c. 2·7	1·39	1·38	·89	·95	—
b.	S. Africa	c. 2·65	1·33	1·35	·88	·95	—

This Mungoose reminds one somewhat of a small *H. caffer*, the colour and character of its fur being very similar, though it has not, of course, the long black tail-tip of that species. Its range seems to be rather limited, as all the specimens with exact localities that I have seen are from the eastern half of the Cape colony (Algoa Bay, Kingwilliamstown, Caffirland, Natal, &c.). It is naturally very likely that it will yet be found further north than Natal; but it is not probable that it will occur in any number, if at all, in the western districts of the colony, or it would surely have been recorded from there before this.

I have not been able to find any mention of the habits of this species.

7. Herpestes punctatissimus.

**H. punctatissimus*, Temm. Esq. Zool. Guin. p. 108 (1853).

Hab. West and South Africa (Gaboon, Algoa Bay, *Temm.*).

I have only seen a single specimen of this species, one of the types

obtained by Dr. Brehm at Algoa Bay, and now preserved in the Leyden Museum. Temminck, in his original description, mentions another specimen, from the Gaboon; but I am told by Dr. Jentink that this is not now in the Leyden Museum.

The following is a description of the Algoa-Bay specimen:—

Fur short and harsh, the hairs on the back barely half an inch long. General colour all over pale grey, the hairs finely grizzled with black and creamy white; belly like the back, except that the hairs have longer pale tips and less black. Tail-hairs rather longer than those on the body, uniformly annulated with black and white: no trace of a darker tail-tip. Feet and legs like the body; soles naked.

Dimensions (Algoa Bay).

Head and body	13·0[1]
Tail.....	10·2
Hind foot	1·75

The skull is so imperfect that the only measurements obtainable are the following, which Dr. Jentink has kindly taken for me:—

Palate-breadth	0·74
Incisors to cross line	0·83

This small species bears a certain resemblance to some of the smaller Indian Mungooses, especially *H. auropunctatus*, Hodgs., though it has much shorter fur than that species. It appears to be very rare, as there seem to have been no specimens recorded in addition to the two mentioned by Temminck, of which, as mentioned above, only one is now in the Leyden Museum.

I may here mention that an examination of the type of *H. microcephalus*, Temm.[2], a species of which the locality was not known, has convinced me that that name must stand as a synonym of *H. auropunctatus*, the specimen being quite similar to the types of Hodgson's species preserved in the British Museum.

8. Herpestes (Ichneumia) albicauda.

H. albicaudus, G. Cuv. Règne Anim. ed. 2, i. p. 158 (1829).

**H. leucurus*, Ehrenb. Symb. Phys. pl. 12. Decas 2 (1830).

Ichneumia albescens, I. Geoff. Mag. Zool. 1839, pp. 16 & 35 (description, not figure) (1839).

**H. loempo*, Temm. Esq. Zool. Guin. p. 93 (1853).

Ichneumia nigricauda, Puch. Rev. et Mag. Zool. vii. p. 394 (1855).

?*Bdeogale nigripes*, Puch. t. cit. p. 111 (1855).

**H. pluto*, Gray, P. Z. S. 1864, p. 552 (nec Temm.) (1864).

Ichneumia abu-wudan, Fitz. & Heugl. Sitzungsb. Ak. Wien, liv. Abth. 1, p. 561 (1866).

Hab. East Abyssinia to Natal, and West Africa (Guinea &c.).

Size large, form rather slender. Tail bushy, rather shorter than

[1] Apparently somewhat stretched.

[2] Esq. Zool. Guin. p. 113 (1853).

the body without the head. Underside of tarsus thickly hairy down to the root of the hallux. Fur of medium length. General colour blackish grey, the longer hairs ringed with black and white, the terminal third nearly always black. Underfur woolly, uniform dirty grey. Feet black. Tail-hairs very long, in some cases with white bases and long shining black tips, so that the whole tail appears to be black; in others with a long white tip beyond the black, so that then the tail appears to be white; in the latter case the hairs at the extreme tip of the tail are generally wholly white.

Fig. 1.

a, *b*. Last lower molars of *Herpestes ichneumon*.
c, *d*. „ „ *H. albicauda*.
a, *c*. Upper view; *b*, *d*. side view.

Skull rather stout and heavy, the muscular ridges, however, but little developed. Brain-case comparatively short, not half the length of the whole skull. Teeth more rounded than in the members of the typical subgenus. Last molars, above and below, proportionally much larger than in *Herpestes*, the lower one with a well-marked extra external cusp between the two usual ones, so that there are five cusps in all (see woodcut, Fig 1, *c*, *d*.). In old specimens, of course, this character cannot be made out, as the cusps are worn off these teeth at a comparatively early age. Dental percentage 71–84.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Type, Nubia (Berl. Mus.)	26·0	15·8	4·9
b. Natal	24·0	15·0	5·0
c. Caffraria (Leyd. Mus.)..	24·5	15·8	4·85
e. W. Africa (type of *H. loempo*, Leyd. Mus.)....	23·0	15·8	4·5

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. Accra.....	4·28	2·16	2·6	1·3	1·5	—
b. W. Africa (Berl. Mus.).....	4·05	2·0	2·41	1·25	1·41	—
c. Abyssinia	3·75	1·88	2·05	1·11	1·35	1·18
d. E. Africa..... c.	3·80	2·07	2·23	1·2	1·37	—

The present rather peculiar species has always, in its white-tailed form, been recognized as the type of a distinct genus or subgenus, for which Geoffroy proposed the name of *Ichneumia*. No one, however, ever seems to have noticed that the black-tailed *H. loempo*, Temm., is not even specifically distinct from the typical form, and therefore, of course, possesses all its more important structural characters. *H. albicauda* and *H. loempo* cannot even be separated as varieties; for the only difference between them, namely the colour of the tail, seems to be purely an individual variation. It is true that for the most part specimens from West Africa, representing *H. loempo*, have black tails, and those from East Africa white tails; but I have seen too many exceptions to this rule to feel justified in regarding the two forms as varietally distinct. Thus there is in the Berlin Museum a specimen from Accra, on the Gold Coast, which has a regular white tail, just as in the typical *H. albicauda*; and, on the other hand, black-tailed specimens from East Africa are by no means rare. Moreover, in the British Museum we have two specimens from the Bogos country, Abyssinia, received together, and the skulls of which are quite identical, one of which has a black *loempo*-like tail, and the other has a tail with quite as much white on it as in average *albicauda*. We thus see that the presence or absence of a white tip to the tail-hairs is a character upon which no specific distinction can be founded; and, in fact, it would rather seem that the white tail is the result of a desert life, specimens from sandy districts having, as a rule, white, and those from forest regions, black tails.

Ichneumia albescens, I. Geoff., appears to be simply a pale form of this species, in which the longer hairs are fewer in number, so that the grey underfur shows more on the surface, and thus gives a generally paler colour than usual.

I. nigricauda, Puch., seems to be quite identical with this species, representing the usual West-African black-tailed form.

With regard to *Bdeogale nigripes*, Puch., from the Gaboon, I have already mentioned my suspicion that it has accidentally lost the first toes on all four feet; and it seems very possible that it is really only a white-tailed specimen of this species, and not a *Bdeogale* at all. The original description would exactly fit the Accra white-tailed specimen already referred to; and that is certainly a true *Herpestes*, as the fifth toes are present on all the feet[1].

Of all the Mungooses, *H. albicauda* seems to be the most nearly allied to the true *Bdeogale*, strongly resembling the species of that genus in general colour, quality of fur, length and bushiness of tail, hairiness of tarsus, proportionally large size of the last molar, and most of all in the presence of the median middle external cusp to the last lower molar, a character in which *Bdeogale* differs from all other

[1] Since writing the above I have received a letter from Prof. Barboza du Bocage, in which he informs me that the specimen from Angola, referred by him (P. Z. S. 1865, p. 402) to *Bd. nigripes*, proves on a closer examination to possess minute 1st claws to the fore feet, thus strongly confirming my previous opinion about that animal.

Mungooses except the present species and those of the very distinct genus *Crossarchus*. The absolute sizes of the molars in *Bdeogale* are, however, as is shown in the table of dimensions, much less than in *Ichneumia*.

The following table gives the dimensions of the last upper premolar and last molar of the species of *Herpestes*, with the percentage of the latter to the former. The letters correspond to those denoting the different skulls of which the measurements are given above. Where the teeth belonging to a skull not previously referred to are measured, an asterisk is inserted instead of a letter.

		P.M^4.	M^2.	Percentage.
		mm.	mm.	
H. ichneumon	*a*...	11·0	5·0	45
	b...	10·8	4·9	45
	c...	10·3	5·0	48
H. caffer	*a*...	12·0	5·4	45
	c...	12·0	5·5	46
H. gracilis, typ. var.	*a*...	7·6	3·7	48
	b...	8·0	4·1	51
	***...	8·0	3·8	47
	***...	8·1	4·5	55
„ „ var. melanurus,	*c*...	7·5	3·5	47
„ „ var. badius ...	*d*...	7·6	3·8	50
	e ..	7·4	3·5	47
„ „ var. ochraceus,	*f*...	7·1	3·9	55
H. sanguineus	*a*...	6·7	2·8	42
H. galera, typ. var.	*a*...	12·0	7·1	59
	b...	11·9	6·7	56
	c...	13·2	7·6	58
	d...	11·8	7·2	61
„ „ var. robustus ...	*e*...	12·0	7·0	58
	f...	13·2	7·5	57
H. pulverulentus	*a*...	9·0	4·0	44
	b...	9·0	3·9	43
H. punctatissimus	*a*...	7·0	3·5	50
H. (Ichneumia) albicauda,	*a*...	9·9	7·1	71
	b...	9·4	6·9	73
	c...	9·0	7·0	78
	d...	9·0	7·5	83
	***...	9·0	7·6	84
	***...	9·0	7·0	77

II. Helogale.

Type.

Helogale, Gray, P. Z. S. 1861, p. 308..... *H. parvula.*

Range. Mozambique to Natal.

Toes 5—5. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{3}{3}$, M. $\frac{2}{2}$ $\times 2 = 36$. Outlines of skull more rounded than in *Herpestes*, even in old specimens. Underside of tarsus naked. Tail shorter than the body. Other characters as in *Herpestes*.

This genus was separated from the true Mungooses by Dr. Gray on account of the presence of only three premolars in each jaw, instead of four as normally possessed by *Herpestes*. It is true that in that genus, as mentioned above, the first small premolar is frequently absent; but in these cases there is always a vacant space where the tooth usually stands; while in *Helogale* the tooth which corresponds to the second premolar stands quite close to the canine, leaving no diastema whatever.

In addition to this character, the general shape of the skull is quite different from that of *Herpestes*, being shorter, broader in proportion, the walls of the brain-case thinner, and all the surfaces much smoother, with less well-marked muscular ridges. The figures of the skull quoted in the synonymy below show the difference in general appearence very well.

The form of the teeth is, as Prof. Peters remarks, very similar to that found in "*Herpestes fasciatus*," which likeness extends to the other species of *Crossarchus*: but the two genera may of course be readily distinguished by the different shape of the skull, and by the presence in *Helogale* of the distinct naked line from the nose to the upper lip already referred to.

The skulls and dentition of the two species of this genus seem to be very much alike, though there is a slight difference in the size of the last molars.

1. Helogale parvula.

**Herpestes parvulus*, Sundev. Œfv. af Kongl. Vet. Ak. Förhandl. 1846, p. 121.

Helogale parvula, Gray, P. Z. S. 1861, p. 308 (woodcuts of skull).

Hab. Natal (*Wahlberg*).

Size small, form slender; tail rather shorter than the body without the head. General colour above and below dark finely grizzled grey-brown, the hairs annulated with black or brown and yellowish white. Feet and tail like body but rather darker. No trace of rufous on any part of the body.

Last molar proportionally somewhat larger than in *H. undulata*. Dental percentage 79–80.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Natal (one of the types)	9·5	5·5	1·5
b. „ (*Warwick*)	8·3	4·6	—

Skull.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. Natal.....	1·82	1·13	·90	·63	·61	·65
b. „	..	..	·86	·61	·60	—

Of this species, the smallest of all the Mungooses, Dr. Sundevall obtained in the typical series a considerable number of specimens; but, curiously enough, no others have come to any of the Museums that I have seen, except specimen *b* measured above, which was obtained from Natal through a dealer. However, Dr. Sundevall distributed specimens so freely, that there are some of his original specimens of this species in most of the larger European Museums.

2. HELOGALE UNDULATA.

**Herpestes undulatus*, Peters, Reise n. Mossambique, p. 114, Taf. xxv. (animal and skull) (1852).

Hab. East Africa (Mozambique, *Peters*; Taita, *Hildebrandt*).

Size, compared with that of most *Herpestæ*, small, though slightly larger than *Helogale parvula*. Form slender. Tail rather shorter than the body without the head. General colour grizzled rufous, the longer hairs annulated with black and white; underfur for basal portion grey, terminal portion red. Neck, belly, and legs rich rufous, with less black grizzling. Tail coloured like back, no black tip.

Skull as in *H. parvula*, but larger, and the last molar smaller in proportion; dental percentage about 70.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Type, Mozambique (*Peters*)	9·4	6·7	1·56
b. Taita (*Hildebrandt*).....	9·9	6·1	1·48

Skull.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.
a. Taita.....	2·0	1·24	·99	·68	·65

This species may be readily distinguished from *H. parvula* by its larger size and its bright rufous belly and underside of neck, these parts in *H. parvula* being a dull grizzled brown. I only know of the two specimens of which the dimensions are given above; so that I am not in a position to state what the full range of this form is.

Dr. Peters states that *H. undulata* is particularly fond of eggs, which it breaks by throwing them with its fore legs *through* its hind ones against a wall.

Molars of Helogale.

	P.M^1.	M^2.	Percentage.
H. parvula.			
a.	5·0	4·0	80
b.	5·2	4·1	79
H. undulata.			
a.	5·6	4·0	71

III. Bdeogale.

Type.

Bdeogale, Peters, Reise nach Mossamb., Säug. p. 119 (1852) ..... *B. crassicauda.*

Range. East Africa (Mozambique, Zanzibar); ? West Africa (Gaboon).

Toes 4—4. Teeth and other characters as in *Herpestes*, with especial resemblance to those of the subgenus *Ichneumia* (see above, p. 77). In Dr. Peters's original description, he states that on the fore feet there is only a minute rudiment of a first metacarpal, and on the hind feet not even this trace of the normal first toe. In a spirit specimen of *B. puisa* in our collection, I cannot even find the rudimentary first metacarpal, so that this individual is absolutely without any remnant of the first digit.

The following are the three species which have been described as belonging to this genus; but it must be confessed that the two Mozambique species are very closely allied to each other; and as to the West-African one, I have already stated my belief that it is only a synonym of *Herpestes albicauda*; but not having had the opportunity of examining the type, I put it provisionally in its place here, with Dr. Pucheran's short diagnosis appended.

1. Bdeogale crassicauda.

* *B. crassicauda*, Peters, tom. cit. p. 120, Taf. xxvii. (1852).

Hab. Mozambique (Tette-Boror).

Characters much as in *B. puisa* (described below), except that the tail is distinctly longer in proportion, and the tail-hairs, which are very long, have their basal halves white and their terminal black, while in *B. puisa* they are uniformly blackish brown. The last molar also in the present species seems to be proportionally somewhat longer, judging from Dr. Peters's excellent figures.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Mozambique (type)	17·0	10·6	3·15

Skull.

	Length[1].	Breadth.	Palate-length.
a. Type (from Peters)	3·15	1·79	1·96

2. Bdeogale puisa.

* *B. puisa*, Peters, tom. cit. p. 124, Taf. xxviii. (1852).

Hab. Mozambique (Mossimboa) (*Peters*); Zanzibar (*Kirk*).

Size rather large; form slender; tail short, not half so long as the head and body. Underside of the hind foot thickly hairy to the base of the toes. General colour dull brownish, with or without annulations. Underfur tawny yellow, long and soft. Limbs

[1] From front of jaw to foramen magnum.

darker, nearly black. Head greyish. Tail bushy, uniformly blackish brown.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Type, Mozambique (very old) ..	20·8	9·1	3·25
b. Zanzibar (*Kirk*)	15·0	7·0	3·0

Skull.

	Length.	Breadth.	Palate-length.
a. Type (from Peters)	3·4	2·1	2·1

This species, of which Dr. Kirk has sent us a rather small specimen from Zanzibar, is found further north than its ally *B. crassicauda*. Our specimen being in spirit, I have been able to examine carefully the state of the feet with regard to the absence of the first toes; and I find, as mentioned above, no trace whatever of these digits; while in species which normally possess five toes, and the first one is in any case accidentally lost, there are generally some remains left of the missing digit, in the shape of a broken metacarpal or metatarsal [2].

The species of this group would seem to be very rare, as I have seen no other specimens of either *B. crassicauda* or *puisa* besides the types of the two species in the Berlin Museum, and Dr. Kirk's one already referred to.

3. ? Bdeogale nigripes.

B. nigripes, Pucheran, Rev. et Mag. Zool. vii. p. 111 (1855).

Hab. W. Africa (Gaboon).

"*Major; corpore albescente; cauda candidissima; artubus nigris.*"

No dimensions of any sort are given.

Dimensions of Teeth of Bdeogale.

	P.M^4.	M^2.	Percentage.
B. crassicauda.			
a. Type (from Dr. Peters's figure)....	7·5	5·5	73
B. puisa.			
* Zanzibar (*Kirk*)	6·9	4·5	66

IV. Cynictis. Type.

Cynictis, Ogilby, P. Z. S. 1833, p. 48..... .... *C. penicillata.*

Range. That of the only species.

Toes 5—4[1]. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{4}{4}$, M. $\frac{2}{2} \times 2 = 40$. Muzzle with a distinct naked line from nose to upper lip. Hind soles quite hairy. Frontal portion of skull strongly convex, brain-case high. A well-marked vacuity in the floor of the auditory meatus, consisting of a more or less rounded hole, which, as the animal gets older,

[1] See above, p.61.

[2] Our only skeleton of this genus has not the smallest rudiment, even of the metatarsal, of the hallux.

gradually fills up, but never produces the row of small holes found in *Suricata*. Other characters as in *Herpestes*.

This genus is a very distinct and well marked one, not only on account of its different number of digits, but also of the fact that its skull is very differently shaped from that of *Herpestes*, more resembling that of *Suricata* than that of any of the genera of this section.

In Smuts's work on the Mammals of the Cape, published a year before Mr. Ogilby described the genus, the absence of the hallux in this form was noticed, and Dr. Smuts stated his opinion that a special genus ought to be formed for it. He did not, however, give it a name, so that that given by Mr. Ogilby stands unaltered.

The only well authenticated species is

1. CYNICTIS PENICILLATA.

Herpestes penicillatus, G. Cuv. R. A. (edit. 2), i. p. 158 (1829).
Mangusta levaillantii, A. Smith, Zool. Journ. iv. p. 437 (1829).
**Cynictis steedmanni*, Ogilby, P. Z. S. 1833, p. 49 (1833).
Cynictis typicus, Smith, S. Afr. Quart. Journ. ii. p. 116 (1835).
**C. ogilbii*, Sm. t. cit. p. 117 (1835); Ill. Zool. S. Afr. pl. 16 (1849).
Ichneumia albescens, Geoff. Mag. Zool. 1839, pl. 12 (figure, not description) (1839).
**C. leptura*, Smith, Ill. Zool. S. Afr. pl. 17 (1849).

Hab. Cape Colony.

Size medium; form slender, head rather small in proportion. Tail about the length of the body without the head, very bushy. Colour varying from dark yellow (*C. steedmanni*) to light yellowish grey (*C. ogilbii*); longer hairs with their basal halves light yellow, then with a black subterminal ring, and their tips white. The variation in the general colour is caused by the different lengths of these white tips to the hairs. Underfur rich yellow. Chin white; belly and legs rather paler than back. Tail very bushy, the hairs often over 2 inches in length, and coloured like the longer back-hairs—namely, first yellow, then black, and the tips white. Hairs at tip of tail white to their roots. Dental percentages 57–66.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Type of *C. ogilbii*	15·0	9·0	3·0
b. S. Africa.....	15·0	9·0	3·0
c. „	15·5	9·3	3·1

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. Type of *C. ogilbii*	2·65	1·6	1·42	·90	·97	·92
b. Type of *C. leptura* ..... (*c*)	2·69	1·61	1·39	·87	·95	—
c. Type of *C. steedmanni*..... (*c*)	2·68	1·56	1·41	·90	·98	—

This species may be readily distinguished from all its allies by its bushy white-tipped tail and its peculiar greyish yellow colour. I can find no tangible specific differences between the various forms which have been described as distinct species. *C. leptura*, Smith, judging from his figure, appears to be slightly different from the rest; but the typical skull, in the British Museum, shows no characters whatever by which to separate that form from the rest; moreover there is in the Leyden Museum a specimen, in other respects quite the same as *C. penicillata*, which has as slender a tail as *C. leptura*. I therefore do not think that the latter can stand as a species distinct from *C. penicillata*.

Dr. Smith, in the letterpress to his figure of *C. ogilbyi* in his 'Illustrations,' gives a full account, too long to quote here, of the habits of this species. It is said to inhabit dry and sandy plains, where it lives in holes in the ground, to which, however, it only retires during the night, passing the day in hunting for mice, small birds, &c., or simply basking in the sun.

Teeth of Cynictis.

	P.M^1.	M^2.	Percentages.
a.	8·1	5·1	63
b.	7.5	5·0	66
c.	8·9	5·3	59
*	8·0	4·6	57

V. Rhinogale.

Type.

Rhinogale, Gray, P. Z. S. 1864, p. 375 (woodcuts of skull).. ..... *R. melleri*.

Range. That of the only species.

Toes 5—5. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{5}{4}$, M. $\frac{2}{2}\times 2=42$. No naked line from nose to upper lip. General form of skull rounded, without marked angles or crests. Palate deeply concave both transversely and antero-posteriorly. Teeth rounded, suited for grinding rather than cutting. Last molars above and below proportionally very large, the lower one as long as the first molar, and very possibly with an extra external cusp; but the teeth are too much worn in the only known specimen for this point to be made out. Lower jaw rather peculiarly twisted (*cf.* original figures).

This genus is a somewhat remarkable one, having the general external form of the true grooved-nosed Herpestines, while it has the hairy nose and the generally rounded skull and dentition of the present section of the group. It is, moreover, quite peculiar among the genera of this group in possessing a distinctly concave palate, a character which readily separates it from all other Mungooses. I am not prepared to say at present to which of the other genera *Rhinogale* is most nearly allied, as it presents such a mixture of characters that without further material a satisfactory decision on this point is extremely difficult to arrive at. However, it naturally falls into this place by the characters used to arrange the other genera; so that we

may, for the present, leave it here, where it was originally placed by Dr. Gray.

1. Rhinogale melleri. (Plate III.)

**Rhinogale melleri*, Gray, P. Z. S. 1864, p. 375 (1864).

Hab. "East Africa."

Size and form much as in *Herpestes ichneumon*. Tail about as long as the body without the head. Hind soles hairy to the roots of the toes. General colour uniform pale brown, the longer hairs each with only one or two rings of brown and white, the rings passing so gradually into each other as to give but little general appearance of grizzling. Head paler, the white of the hairs showing more conspicuously. Underfur dark grey at its base, pale brown at its tip. Belly like back, but rather paler. Feet similar, but darker. Tail with long hairs, somewhat as in black-tailed examples of *H. albicauda*: for its basal third the hairs are uniformly brown; for the middle third they are white for their basal halves and black for their terminal; and on the terminal third they are all black; the tail therefore gets very gradually darker towards the end. No doubt other specimens would show considerable variation in the detailed coloration of the tail.

Skull as described above in the generic diagnosis.

Teeth rounded, the posterior molars worn flat in the only specimen. Dental percentage 73. In the lower jaw the posterior molar is remarkably large, being precisely as long as the preceding tooth; while the species which most approaches it in this character, *Bdeogale puisa*, has the last only 85 per cent. of the first molar, and the others of this group range downwards from 85 to 45 per cent., the proportions of these two teeth following with great regularity those of the upper teeth, of which the percentages are given in detail.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Type, E. Africa.....	22·0	15·5	3·8

Skull.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. Type ..	3·38	1·85	1·78	1·05	1·22	1·14

The type specimen of this species, though obtained by Dr. Meller and described nearly 20 years ago, has, as far as I know, remained unique up to the present time. Happily both the skull and skin are quite perfect, so that I have been able to make out all the more important characters of the species.

With regard to the locality at which this specimen was obtained, it appears that the only places in East Africa at which Dr. Meller collected were (1) on the Zambesi and (2) Zanzibar; so that *R. melleri* must have come from one or the other. As of late years

Dr. Kirk has done so much to make the zoology of Zanzibar known to us, it seems on the whole more probable that this species does not occur there, but that the Zambesi is its proper habitat, especially as Dr. Meller was there considerably longer than he was at Zanzibar.

However, it is not very likely that it can be much longer before such a large and well-marked animal is again discovered; and then the question of locality will be satisfactorily settled.

Molars of Rhinogale.

	Upper P.M⁴.	M².	Per-centage	Lower M₁.	M₂.	Per-centage.
R. melleri ... *a.*	7·5	5·5	73	6·4	6·4	100

VI. Crossarchus.

Type.

Crossarchus, F. Cuv. Hist. Nat. Mamm. ii. livr. 47 (1825) ..... *C. obscurus.*

Ariela, Gray, P. Z. S. 1864, p. 565 (1864).... *C. fasciatus.*

Mungos, Gray, P. Z. S. 1864, p. 575 (1864) (nec Ogilby[1]) ..... *C. gambianus.*

Range. Africa south of the Sahara.

Toes 5—5. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{3}{3}$, M. $\frac{2}{2}\times 2=36$. No naked central line on nose. Hind soles naked. Skull depressed, as in *Herpestes*. Teeth rounded, without sharp cutting-edges. Vacuity in floor of auditory meatus oblong, in filling up often forming a row of small holes, as in *Suricata*. Last lower molar with an extra cusp in the centre of the outer edge, as in *Bdeogale* and the subgenus *Ichneumia*[2].

This genus includes four species, scattered over the continent of Africa. It is a matter of considerable interest to find that the three species placed by Gray under "*Mungos*," in a separate subfamily from *Crossarchus*, are not really generically distinct from the single species hitherto supposed to be the only member of this genus[3]. I can find no differences of importance whatever between these various forms; in fact *C. obscurus* resembles, at least in dentition, *C. zebra* and *C. gambianus* more than either of these do *C. fasciatus*. It is true that in our only skeleton of *C. obscurus* there is a certain amount of difference in the length of the hallux as compared with that of the other species; but an examination of a considerable number of skins does not show any constancy in this character,

[1] Ogilby's genus was founded solely on the Cinghalese species *H. vitticollis*, Benn.; *H. gambianus* and *fasciatus* happening to be mentioned in the same paper, Gray took it as founded on them, and made another genus, "*Tæniogale*," to contain the Ceylon form.

[2] See p. 76.

[3] Since the above was written, Prof. Mivart has pointed out to me that the researches of Chatin into the structure of the anal glands of the Carnivora (Ann. Sci. Nat. 5th series, xix. p. 89, n., 1874) fully confirm the opinion here expressed as to the generic relationship of the striped Mungoose (*C. fasciatus*) with *C. obscurus*.

which has already been proved to be one of singular variability [1]. No doubt, also, *C. obscurus* has a somewhat more elongated nose than the other species; but the value of this character, besides being almost impossible to estimate without spirit specimens, is extremely doubtful; and the remarkable agreement in other characters convinces me that *C. obscurus* is certainly congeneric with *C. zebra*, *gambianus*, and *fasciatus*.

Most specimens of *C. obscurus* have a remarkably short alisphenoid canal, as compared with that of most Mungooses; but one of our specimens has the canal quite as long as in ordinary *C. zebra*, the species which has the next shortest canal.

The species of this genus seem to be somewhat restricted in their geographical distribution. Thus *C. obscurus* has hitherto only been found from the Cameroons to Sierra Leone, *C. gambianus* on the Gambia, *C. zebra* in Abyssinia, and *C. fasciatus* in the eastern part of the Cape colony and as far north as Mozambique [2].

Synopsis of the Species.

I. Back grizzled, not cross-striped.
  a. Colour dull brown, tips of hairs yellow..... 1. *C. obscurus*, p. 87.
  b. Colour grizzled grey, hairs annulated..... 2. *C. gambianus*, p. 88.
II. Back cross-striped.
  c. P.M^4 more than 8 mm. Stripes narrow.
    Underside rufous ..... 3. *C. zebra*, p. 89.
  d P.M^4 less than 7 mm. Stripes broad.
    Underside grizzled grey ..... 4. *C. fasciatus*, p. 90.

1. Crossarchus obscurus.

Crossarchus obscurus, F. Cuv. Hist. Nat. Mamm. iii. livr. 47 (1825).

Crossarchus typicus, A. Smith, S. Afr. Quart. Journ. ii. p. 135 (1835).

Hab. West Africa.

Size medium; form rather stout; muzzle produced. Tail about half as long as the head and body. General colour dull grizzled brown; the longer hairs dark brown for four fifths of their length, and the tips yellow. Underfur brown at base, light grey for terminal half. Belly like back. Head more finely grizzled, with a rufous tinge. Feet almost wholly black. Tail like back, but the yellow tips of the hairs gradually become red towards the tip.

Skull long and narrow, with a narrow and depressed nasal region. Teeth very small, upper P.M^1 but seldom reaching 7 mm. in its greatest diameter. Dental percentage 71–77.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Cameroons	15·0	7·5	2·8
b. W. Africa	12·5	..	2·5

[1] See above, p. 67.
[2] See footnote 2 on p. 90.

	Skull.					
	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. W. Africa (*Rich*)	2·88	1·54	1·6	·85	·97	—
b. Zool. Soc...	2·8	1·43	1·6	·84	·96	·84
c.	..	1·39	1·55	·85	·98	—

This species is a very well known and fairly common one, though it seems to be quite restricted to the West-African subregion. Its superficial likeness to small dark-coloured specimens of *Herpestes galera* has already been refered to above[1].

A specimen in the Berlin Museum has the following note attached to it:—"Bores in the earth with its nose after insects."

2. Crossarchus gambianus.

**Herpestes gambianus*, Ogilby, P. Z. S. 1835, p. 102.

Mungos gambianus, Gray, P. Z. S. 1864, p. 575.

Hab. Gambia.

Size, form, and general coloration much as in *C. fasciatus* (q. v.); but the hairs on the back placed, so to speak, without reference to their rings, so that there is no trace of cross bands, but only a general grizzled appearance; and thus the posterior part of the body only differs from the head and shoulders in being more rufous. Neck and chest white; on the sides of the neck a distinct black streak separating the upper and lower colours, in this respect reminding one of *Herpestes vitticollis*, Benn.

Skull broad and heavy as in *C. fasciatus*. Teeth small, as in *C. obscurus* and *zebra*. P.M^4 only 6 mm. long. Dental percentage 80.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Gambia (type).....	15·0	..	2·5

	Skull.					
	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. Type....c.	2·85	1·58	1·43	·84	·92	—

This species is very interesting as showing what a comparatively unimportant character the presence of cross bands on the back is. Its coloration is extremely similar to that of *C. fasciatus*; yet by a simple disarrangement of the hairs of the back, all the broad distinct cross bands vanish, and the back only presents a coarse grizzled rufous-grey colour.

The type was collected by Mr. Rendall on the river Gambia, whence, at about the same time, a second specimen (immature) was sent to the late Lord Derby. Both these specimens are now in the

[1] P. 73.

British Museum; but no others, so far as I am aware, have since been obtained.

3. Crossarchus zebra.

**Herpestes zebra*, Rüpp. N. Wirb. Abyss. p. 30, pl. ix. fig. 2 (animal), and pl. x. fig. 1 (skull) (1835).

H. gothneh, Fitz. & Heugl. S.B. Akad. Wien, liv. Abth. 1, p. 560 (1866).

H. leucostethicus, Fitz. & Heugl. t. cit. p. 561 (1861).

Hab. Abyssinia.

Size rather smaller than in the last species, and form slenderer. Tail half as long as the head and body. General colour grizzled grey, with cross bands on the posterior part of the back. Longer hairs ringed with black and pale yellow or white, without any rufous, the rings very narrow, so that the transverse bands are correspondingly narrow, five or more to the inch. Underfur dirty yellowish grey. Chin, chest, and belly more or less bright rufous, a sharp line along the sides of the neck separating the rufous from the grey of the upperside. Central line of the underparts generally white, this colour varying in quantity very much, sometimes extending all down the centre from chin to anus, sometimes nearly or quite absent. Tail-hairs ringed like those of the body, the black gradually predominating towards the tip, which is often quite black. Feet, in the same way, becoming blacker to the toes.

Skull as in *C. gambianus*. Teeth rather small, P.M^4 between 6 and 7 mm. long. Dental percentages 66–79.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Abyssinia (*Rüppell*)	13·5	7·0	2·3
b. ,, (skin)	13·0	6·6	—

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. No locality ..	2·75	1·59	1·46	·95	·94	·97
b. ,, ..	2·7	1·5	1·43	·88	·89	·95
c. Bogos, Abyssinia[1]	2·42	1·35	1·26	·79	·80	·89

This species has hitherto been found only in Abyssinia, where Rüppell and others have obtained it in considerable numbers. It may readily be distinguished from the other striped Mungoose, *C. fasciatus*, by the narrowness and whiteness of the cross bands, and by the sharply defined rufous of its neck and chest.

I can see no reason for the separation of either *H. gothneh* or *leucostethicus* from the typical form, the characters given being quite unimportant.

It has already been mentioned that one of our skulls of this

[1] With third upper molars.

species possesses a third pair of upper molars behind the two normal ones. The presence of this extra pair of teeth however, is, shown to be of no specific or generic importance by the fact that in a second, quite identical, specimen collected at the same time and place (Bogosland, Abyssinia), there are only the two usual pairs of upper molars.

4. Crossarchus fasciatus.

Viverra ichneumon β, Schr. Säug. iii. p. 430, pl. cxvi. (1778).
V. mungo[1], Gmel. Linn. S. N. i. p. 84 (1789).
Herpestes mungo, Desm. Mamm. i. p. 211 (1820).
H. fasciatus, Desm. Dict. Sci. Nat. xxix. p. 58 (1823).
**Ichneumon tænionotus*, Smith, S. Afr. Quart. Journ. ii. p. 114 (1835).
Ariela tænionota, Gray, P. Z. S. 1864, p. 565 (1864).
Hab. S.E. Africa (Caffraria to Mozambique[2]).

Size medium; form stout. Tail rather more than half as long as the head and body. General colour grizzled grey, the posterior half of the back with cross bands. Longer hairs ringed with black and yellow or dark rufous, the posterior half of each light ring being always rufous. The rings somewhat broad, so that the transverse body-bands are also broad, there being about $3\frac{1}{2}$ to the inch, counting both light and dark bands. There are altogether about 12 or 13 bands; but they merge so gradually into the rest of the body-colour that they cannot be exactly counted. Underfur grey-brown. Neck, chest, and belly uniform grizzled grey, like the upper part of the head and shoulders, not rufous as in *C. zebra*. Feet and tail like body, but becoming gradually nearly or quite black towards their distal parts.

Skull comparatively broad and heavy, the teeth larger than in any other species, P.M^4 more than 8 mm. long, last molar small. Dental percentage 57–59.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. Cape	13·0	8·0	2·8
b. Natal (type of *I. tænionotus*)	12·0	7·0	2·4

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a. S. Africa (*Dr. Smith*)	2·84	1·67	1·51	·98	·99	1·05
b. S. Africa (*Dr. Smith*)	2·79	1·45	1·45	·92	1·00	·96

[1] This name is so utterly barbarous, and that of *H. fasciatus* so well known, that I think we are justified in ignoring it and using Desmarest's classical and appropriate term.

[2] Two specimens, said to be "*Herpestes fasciatus*," are recorded from Angola in the 'List of Animals in Zool. Soc. Coll.' 1879, p. 62; but as neither of these is still living and nothing has been preserved of them, I cannot say whether they really belong to this species, to *C. zebra*, or to some undescribed form.

This species by its locality, and not *C. zebra*, no doubt represents the early-known "*Viverra mungo*," which was said to come from the "East Indies." No cross-striped Mungooses, however, are known from India, and the original specimens must have been obtained from the Cape. All the specimens with exact localities that I have seen come from the eastern parts of the Colony, and none from the western; so that we may suppose that its true range is very similar to that of *Herpestes pulverulentus*[1]. Probably, however, tame examples were sometimes brought down to Capetown, where they would be seen by the earlier travellers. Dr. Smith says of his *Ichneumon tænionotus*, "Inhabits Natal: rare."

Molars of Crossarchus.

		P.M^4.	M^2.	Percentage.
		mm.	mm.	
C. obscurus	*a*...	6·2	4·8	77
	b...	7·0	5·0	71
	c...	6·5	5·0	77
C. gambianus	*a*...	6·0	4·8	60
C. zebra	*a*...	6·9	4·6	66
	b...	6·5	4·5	69
	c...	6·8	5·0	73
	***...	6·5	5·1	79
C. fasciatus	*a*...	8·7	5·2	59
	b...	8·0	5·2	57

VII. Suricata.

Type.

Suricata, Desm. Tabl. Méth. Mamm. in Nouv. Dict. d'H. N. (ed. 1) xxiv. (1804) ..... *S. tetradactyla.*

Rhyzæna, Illig. Prodr. Syst. Mamm. p. 134 (1811) ..... *S. tetradactyla.*

Range. That of the only species.

Toes 4—4[2]. Teeth, I. $\frac{3}{3}$, C. $\frac{1}{1}$, P.M. $\frac{3}{4}$, M. $\frac{2}{2} \times 2 = 38$. Hind soles naked. Nose produced. No central naked line from muzzle to upper lip. Fore claws very long, twice as long as the hind. Skull very broad, the zygomata strongly diverging backwards. Facial outline convex. Posterior part of skull very high, not compressed as in *Herpestes*, but more as in *Cynictis*. Teeth very similar to

[1] See p. 74.

[2] In a skeleton and a specimen in spirit, I find the following rudiments of the 1st toes:—of the fore foot, in the spirit specimen, a rudimentary metacarpus, 2 mm. in length; in the skeleton, no trace of a hallux, but the above-mentioned rudiment might easily have been lost. Of the hind foot, in the spirit specimen, a hallucal metatarsal 2 mm. long and 2½ broad, and, in the skeleton, a similar rudimentary metatarsal and, in addition, a minute 1st phalanx (1½ mm. long and 1 broad).

those of *Crossarchus*. First upper premolar absent, with no diastema in its place; first lower either present or, if absent, there is a distinct diastema. Auditory meatus somewhat prolonged, with the imperfection of the floor well marked, consisting of a line of minute holes, quite different from the large round hole found in this position in *Cynictis*[1].

1. Suricata tetradactyla.

Viverra suricatta, Erxl. Syst. Regn. An. p. 488 (1777).

V. tetradactyla, Schreb. Säug. iii. p. 434, tab. cxvii. (1778).

Mus zenik, Scopoli, Delic. Flor. et Faun. ii. p. 84 (1786).

Viverra zenik et *tetradactyla*, Gmel. Linn. Syst. Nat. i. p. 85 (1789).

Suricata capensis, Desm. Tabl. Méth. Mamm. (p. 15) in Nouv. Dict. d'Hist. Nat. 1st edit. xxiv. (1804).

Rhyzæna tetradactyla, Ill. Prodr. Syst. Mamm. p. 134 (1811).

Suricata viverrina, Desm. Nouv. Dict. d'Hist. Nat. 2nd edit. xxxii. p. 297 (1819).

Rhyzæna typicus, Smith, S. Afr. Quart. Journ. ii. p. 117 (1835).

Hab. Cape Colony (Algoa Bay, Cape, &c.).

Size small; form slender. Tail about half the length of the head and body together. Fur long and soft. General colour light grizzled grey, with black transverse bands across the posterior part of the back. Longer hairs broadly ringed with black and white, the white on the whole predominating; the transverse bands formed by the regular arrangement of the hairs, by which the white and black rings come opposite to each other on adjacent hairs. Underfur dark rufous. Head nearly white, except a distinct oblong black mark round the eyes. Ears black. Tail yellowish, with a well-marked black tip. Feet like body. Skull as described above. Dental percentage 70–79.

Dimensions.

	Head and body.	Tail.	Hind foot.
a. (In spirit) ..	14·0	7·0	2·4
b. S. Africa	15·0	7·5	2·5
c. ,, ...	14·0	8·0	2·5

Skulls.

	Length.	Breadth.	Palate-length.	Palate-breadth.	Inc. to cross line.	Basi-cranial axis.
a..	2·42	1·79	1·37	·90	·88	·74
b..	2·38	1·75	1·36	·84	·84	·76

This animal is a well-known Cape species: it seems to be confined

[1] Prof. Flower, in his paper on the Classification of the Carnivora (P. Z. S. 1869, p. 20), says of this genus:—"Here, and here alone among the Viverridæ, there is a prolonged auditory meatus; but it presents the peculiarity of being fissured along the whole extent of the middle of its floor." It should, however, be noted that *Crossarchus* has a somewhat produced meatus, and that *all* the genera of this group have constantly a more or less fissured meatus-floor, individual skulls often exceeding *Suricata* in this respect.

to that colony; but I have seen so few specimens with exact localities, that I am unable to determine its precise range. It may always be readily distinguished from all other Mungooses by its elongated nose and claws and its peculiar coloration, especially its black ears, no other species having ears differing in colour from the rest of the head.

Smuts says of its habits: —"This animal lives in various parts of the Colony, mostly in mountain caves; it is easily tamed and kept in a state of domestication."

Molars of Suricata.

		P.M^4.	M^2.	Percentage.
S. tetradactyla,	*a*	7·0	5·0	71
,,	*b*	6·3	5·0	79
,,	*	6·5	4·8	74
,,	*	7·0	5·2	74

4. Description of a New Species of Land-Rail from East Africa. By H. B. Tristram, F.R.S., C.M.Z.S.

[Received December 28, 1881.]

I have lately received from Mr. R. C. Ramshaw, a medical missionary who has been stationed for four years in East Africa, a small collection of birds, chiefly of Ploceidæ and Cinnyridæ, formed by him at Ribé, a little to the north of Rabai, and at Jomon, a district extending S. lat. 3°–5° and E. long. 39°–40°.

Among the specimens occurs a Land-Rail which both Mr. Sharpe and Capt. Shelley consider to be undescribed. I therefore venture to describe it as

Crex suahelensis, spec. nov.

C. *capite et regione parotica castaneis; collo superiore fusco; dorso inferiore nigricante; supracaudalibus castaneo marginatis; cauda nigricante, castaneo marginata; mento et thorace albis; pectore rufescente; abdomine albescente; crisso et subcaudalibus læte castaneis; scapularibus brunneis, quaque pluma albo marginata; remigibus nigrescentibus, pogonio externo remigis primi albo; subalaribus brunneis; rostro, tarsis et pedibus olivaceis. Long. tota* 9, *alæ* 3·92, *caudæ* 2·3, *rostri a rictu* ·85, *tarsi* 1·4, *digiti med.* 1·9.

Hab. Ribé, East Africa.

The white edgings to the scapulars and some of the feathers of the back seem to indicate immaturity. In other respects the bird has all the appearance of being adult: and the measurements certainly do not correspond to those of any known species.